from offshore Cape Hatteras), and Bermuda. In addition, Burkenroad (op. cit.: 1-62) recognized several well-defined sub-species or forms of the above three species which occur in the Caribbean, South American Atlantic, and the west coast of Africa.

The first two Biscayne Bay samples (2 December 1960 and 2 February 1960) contained mostly *P. duorarum*. The presence of only a few adult specimens of *P. brasiliensis* in the two samples suggested the possibility that these individuals had migrated into the bay from the Atlantic.

The third sample (10 July 1960) however, contained juvenile, sub-adult, and adult specimens of both *P. brasiliensis* and *P. duorarum*. Many of the adult females of *P. duorarum*, and one adult female of *P. brasiliensis*, were found impregnated. The presence of juveniles of both species in this sample indicate that there are two grooved penaeid species indigenous to Biscayne Bay.

P. duorarum and *P. brasiliensis* of Biscayne Bay are so closely related that it is difficult to distinguish the two species by a cursory examination. Most of the specimens of both species bore abdominal spots and all specimens were brown in color. The dorsal grooves of the sixth abdominal somite of *P. brasiliensis* resemble the narrow channel-like grooves of *P. duorarum* (Form A) but in some instances, the grooves of *P. brasiliensis* were found completely closed.

In contrast, Cuban specimens of *P. brasiliensis* showed wider grooves similar to those of *P. aztecus* (Form A). This variation of the abdominal grooves of the southern and northern specimens of *P. brasiliensis* was pointed out by Burkenroad (op. cit.: 1-62).

The petasmata of the adult males and the thelyca of the adult females of the two species (described and figured by Burkenroad, op. cit.: 1-62) can be distinguished with the unaided eye or with a hand lens. However, characteristics of the sex organs of the juveniles and sub-adults of the two species can only be differentiated microscopically.

I wish to extend my thanks to Conservation Agent William Saunderson, Mr. Robert Still, commercial shrimper, and Mr. Thomas Costello, Jr., U. S. Fish and Wildlife Service, for obtaining the shrimp samples.—Bonnie Eldred, Florida State Board of Conservation Marine Laboratory.

Quart. Journ. Fla. Acad. Sci., 23(2), 1960

SPEAR OF SWORDFISH, *XIPHIAS GLADIUS* LINNAEUS, IMBEDDED IN A SILK SHARK, *EULAMIA FLORIDANA* (SCHROEDER AND SPRINGER)

On April 5, 1958, I caught an eight-foot silk shark, *Eulamia floridana* (Schroeder and Springer), about 15 miles southeast of Lower Matecumbe Key in the Florida Keys. This is nearly over the 100 fathom contour near the western edge of the Florida Current. The capture of this particular shark is of interest since a portion of a swordfish spear was embedded in its back. The fragment, nearly 176 mm. in length, projected about two inches. Apparently the spear entered at an angle, penetrated completely through the shark, and broke off, leaving the broken posterior end of the fragment halfway through the shark. Although the wound had not healed, the injury probably was not

recent since the projecting fragment was slightly worn and discolored and some algal growth was present.

Another occurrence of similar nature has been reported to me by Dr. Gilbert L. Voss. In the summer of 1940 a seven and one-half foot sailfish, *Istiophorus americanus* Cuv. and Val., was taken off Boynton Beach, Florida by Capt. Walter R. Voss. The fish carried in its back the spear of another sailfish of about the same size. The spear had entered at right angles to the body about midway between head and tail at a point half way from the midline to the dorsal surface and projected about four inches from each side. The wound had completely healed. The fish put up the usual fight and seemed to suffer no adverse effects.

Such occurrences are comparatively rare, although billfish (Istiophoridae) and swordfish spears have been found in boat hulls, bales of rubber (Barnard, 1951 Aust. Mus. Mag., 10(4): 265; Smith, 1956 Nature, 178: 1065) and other fishes. Gudger (1940 Mem. Royal Asiatic Soc. of Bengal, 12(2): 215-315) summarizes earlier writings. Shark attacks on free-swimming swordfish are reported and a small swordfish has been taken from the stomach of a mako shark, *Isurus oxyrinchus* Rafinesque. The nature of these attacks is unknown. Perhaps the silk shark and swordfish collided while feeding through the same school of fish. Spears of marlin and sailfish broken off in other billfish probably result from such action. Smith (*loc. cit.*) attributes to pugnacity the presence of spears of billfishes and swordfish in bales of rubber that washed ashore in South Africa. However, billfishes often chase small fishes which seek shelter around debris. Since the larger fish cannot stop or turn abruptly, occasional collision with debris and boats seems inevitable, and this may be the case with swordfish. However, attacks on boats may at times be purposeful, at least with the swordfish.

Wisner (1958 Pacific Sci., 12(1): 60-70) questions the use of the spear in feeding although he gives several examples of tunas, one of which weighed 157 pounds, and other fishes which had been pierced by billfish spears and found in the stomach contents. He thinks, however, that these occurrences are accidental as they are relatively rare.

In my opinion, ramming other large fish or inanimate objects with the spear is accidental in most cases since it may result in breaking off the spear.

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POLYPHOSPHORIC ACID IN AN UNDERGRADUATE LABORATORY EXPERIMENT

The use of many reagents which are of great importance in organic synthesis is restricted in the undergraduate organic chemistry laboratory because of the hazards involved, the expense, or the special apparatus required (ie. HF, BF_3, CH_2N_2, $LiAlH_4$, liq. NH_3). The importance of polyphosphoric acid as a reagent in organic chemistry has been reviewed by Popp and McEwen